

## I CLAIM:

Sub 91/5  
1. A lead free projectile comprising a compacted admixture of iron powder and at least one powder selected from tin, zinc and alloys and mixtures thereof.

2. A projectile of Claim 1 wherein the iron powder consists essentially of particles of about from 44 to 250 microns.

3. A projectile of Claim 1 wherein the at least one powder selected from tin, zinc and alloys and mixtures thereof consists essentially of particles of about from 45 to 180 microns.

4. A projectile of Claim 1 wherein the iron powder and the at least one powder selected from tin, zinc and alloys and mixtures thereof consist essentially of particles of about from 44 to 250 microns.

5. A projectile of Claim 1 wherein the volume ratio of the at least one powder selected from tin, zinc and alloys and mixtures thereof to the iron powder is about from 0.5 to 6.

6. A projectile of Claim 1 wherein the at least one powder is tin, the volume ratio of tin to iron is about 0.5, and the projectile has a theoretical density of about 0.2713 lbm/cubic inch.

7. A frangible projectile of Claim 1.

8. A sintered projectile of Claim 1.

9. An unsintered projectile of Claim 1.

10. A projectile of Claim 1 having a theoretical density of about from 0.26 to 0.28 lbm/cubic inch.

11. A lead free projectile comprising a compacted admixture of at least one high ductility metal powder and a low ductility metal powder, wherein the projectile has a density of less than about 80% of the theoretical density of lead.

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12. A lead free projectile of Claim 11 having a density of less than about 70% of the theoretical density of lead.

10 13. A lead free composite projectile comprising a compacted admixture of a high ductility metal powder and a low ductility metal powder, wherein the low ductility metal powder is less dense than lead and the projectile is less dense than lead.

14. A lead free projectile of Claim 13 wherein the high ductility metal powder is less dense than lead.

15 15. A lead free projectile of Claim 14 having a density of about from 0.26 to 0.28 lbm/cubic inch.

16. A lead free projectile of Claim 15 having a density of about from 0.262 to 0.272 lbm/cubic inch.

17. A lead free projectile of Claim 13 wherein the volume ratio of high ductility metal powder to low ductility metal powder is about from 0.4 to 6.

25 18. A lead free projectile of Claim 13 wherein the admixture comprises a volumetric mix ratio of about two parts high ductility metal to one part low ductility metal.

30 19. A lead free projectile of Claim 13 wherein the low ductility metal is at least one selected from the group consisting of iron, iron alloys and stainless steel.

20. A lead free projectile of Claim 19 wherein the high ductility metal is at least one selected from the group consisting of tin, zinc, alloys of tin, alloys of zinc, and mixtures thereof.

5 21. A lead free projectile of Claim 20 wherein the high ductility metal consists essentially of tin.

22. A lead free projectile of Claim 20 wherein the high ductility metal consists essentially of zinc.

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23. A lead free projectile of Claim 20 wherein the high ductility metal consists essentially of at least one tin alloy.

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24. A lead free projectile of Claim 20 wherein the high ductility metal consists essentially of at least one zinc alloy.

25. A lead free projectile of Claim 20 wherein the high ductility metal consists essentially of a mixture of tin and zinc.

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26. A lead free projectile of Claim 20 wherein the high ductility metal consists essentially of a mixture of at least one tin alloy and zinc.

27. A lead free projectile of Claim 20 wherein the high ductility metal consists essentially of a mixture of tin and at least one zinc alloy.

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28. A lead free projectile of Claim 20 wherein the high ductility metal consists essentially of a mixture of at least one tin alloy and at least one zinc alloy.

29. A lead free projectile of Claim 20 wherein the low ductility metal powder is at least one selected from the group consisting of iron, iron alloys and stainless steel.

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30. A lead free projectile comprising a compacted admixture of a high ductility metal powder and a low ductility metal powder, wherein the high and low ductility powders are within a density ratio or range of about 0.260 - 0.280 lbm/cubic inch.

5 31. A lead free projectile comprising a compacted admixture of a high ductility metal powder and a low ductility metal powder, wherein the high and low ductility powders are within a density ratio or range of about +/- 10% of the apparent density of iron powder.

10 32. A lead free projectile of Claim 31 wherein the density of the high ductility metal powder is about from 10% greater than the density of wrought iron to 10% less than the density of wrought iron.

15 33. A lead free projectile having a density less than the theoretical density of lead.

34. A cold compacted projectile of Claim 33.